# T08D05 – (18.2) Buffer Solutions ****Notes****

Name ……………………………………………………..

1. 18.2.1 Describe the composition of a buffer solution and explain its action. (3)
   1. What is a buffer solution?
   2. What types of processes need to resist change in pH?
   3. There are three different types of buffers, describe each below:

|  |  |  |
| --- | --- | --- |
|  | **What are they Prepared from** | **An example:** |
| **Acid Buffers** |  |  |
| **Basic Buffers** |  |  |
| **Neutral Buffers** |  |  |

* 1. The action of a buffer – **Acidic Buffers**:
     1. Write the equations that go along with the example from above using ethanoic acid and its salt:
     2. If an **acid is added** to this solution, what happens?
     3. If a **base is added** to this solution, what happens?
  2. The action of a buffer – **Basic or Alkaline Buffers:**
     1. Write the equations that go along with the example from above using ammonia and its salt:
     2. If a **base is added** to this solution, what happens?
     3. If an **acid is added** to this solution, what happens?
  3. Derive the Henderson-Hasselbalch equation:
     1. Equation for the equilibrium of a weak acid:
     2. The acid dissociation constant expression:
     3. If we rearrange:
     4. Taking the negative log of both sides, we find the Henderson-Hasselbalch equation as:
     5. What does the Henderson-Hasselbalch equation indicate?
  4. The Characteristics of a Buffer are:
     1. Dilution:
     2. Buffering Capacity:

1. 18.2.2 Solve problems involving the composition and pH of a specified buffer system. (3)
   1. **Calc #1 – pH of a Buffer**: Calculate the pH of a buffer containing 0.20 moles of sodium ethanoate in 500cm3 of 0.10 mol dm-3 ethanoic acid. Ka for ethanoic acid is 1.8x10-5
   2. **Calc #2 – Mass of Required Salt**: Calculate the mass of sodium propanoate (M=96.07g mol-1) that must be dissolved in 1.00dm3 of propanoic acid (pKa = 4.87) to give a buffer solution with pH of 4.5.
   3. **Calc #3 – pH of Buffer after base is added**: A buffer contains 0.20mol of sodium ethanoate in 500cm3 of 0.10 mol dm-3 ethanoic acid. Ka for ethanoic acid is 1.8x10-5: Calculate the pH after 0.025 moles of sodium hydroxide is added